HEALTH
UNIVERSITY OF UTAH

College of Pharmacy
L.S. Skaggs Pharmacy Institute
Department of Pharmacotherapy

30 South 2000 East
Salt Lake City, Utah 84112
Office 801-587-3472
Fax 801-587-7923

An Expert Report

for the

National Prescription Opiate Litigation

MDL 2804

Provided by:

Daniel C. Malone, BS Pharmacy, MS, PhD, FACMP
Professor
Department of Pharmacotherapy
University of Utah

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Expert Experience and Qualifications

Details regarding my professional career with respect to education, training, and research can be found in my curriculum vitae (CV) (See Attachment Figure 1). In summary, I received a bachelor of science (magna cum laude) in pharmacy from the University of Colorado in 1987. Shortly thereafter, I passed the State of Colorado pharmacist license examination (#12379) and practiced as a pharmacist in both hospital and community settings. In 1988 I became licensed as pharmacist in the State of Texas (#30390). Up through 1993 I was employed as a pharmacist for various hospitals and community pharmacies, including both Walgreens and Walmart. Since 1993 I have pursued an academic career but kept my licenses active until 2019 (Colorado) and 2020 (Texas).

My research career over the past 29 years has been focused on improving medication and patient safety. This work has largely been supported by the Agency for Healthcare Research and Quality (AHRQ), but I have also received funding from the Centers for Disease Control and Prevention, various state agencies, and also the pharmaceutical industry. The balance of my research has been federally supported, starting in 2001 with the Arizona Center for Education and Research on Therapeutics (AzCERT) (1U18HS017001 (Principal Investigator (PI): Woosley)), with a principal focus on preventing drug-drug interactions. Within the AzCERT, I led multiple investigations to evaluate health-system issues concerning preventing drug interactions from 2001 to 2011. In 2009, I also successfully secured funding for a conference grant (**R13HS18307 (Malone-PI)**) to assemble a group of world-renowned experts on drug interactions. Building the that success, I led a large conference grant supported by AHRQ (**1R13HS021826; (PI: Malone)**) to develop standards for drug interaction evaluation, classification, and communication for clinical decision support systems. My research currently includes an R01 **(1R01HS025984; (PI:Malone)** and a previously funded R21 (**1R21HS023826; (PI:Malone)**) studies to identify risk factors for drug interactions, develop algorithms to implement such risk factors within clinical health records, and conduct studies in a learning healthcare network to reduce excessive alerts while appropriately identifying patients at risk of harm. In fall of 2019 I obtained a U18 award (**1U18HS027099; (PI:Malone)**) to develop a smart app to prevent drug interactions that will reside within electronic health records. I am also PI on a R18 dissemination grant (**1R18HS026662-01: Malone PI**) focused on reducing exposure to medications that prolong the QTc cardiac signal using a validated risk score and clinical decision support in 28 hospitals. In addition to these successful research projects, I was the PI on iAdapt – Innovative Diffusion of Comparative Effectiveness Research (CER) (**1R18HS19220**) that educated Pharmacy & Therapeutic committee members about CER methods and AHRQ's Effective Healthcare Program. Over my career I have published more than 210 papers (more than 195 peer-reviewed) and have obtained over $23 million in extramural support as PI or co-Investigator.

With respect to the issues associated with the National Prescription Opiate Litigation, I have significant experience using data from pharmacies, pharmacy administrative claims data, prescriber DEA registration files, electronic health record data, and various healthcare databases including data from insurance companies and various payers such as Medicare,

Department of Veterans Affairs, and Medicaid. I have spent 20 years studying the issue of drug-drug interactions and how to provide useful information to both prescribers and pharmacists to reduce exposure to harmful combination. This work includes studies evaluating knowledge of drug-drug interactions (DDIs), evidence supporting existence of harm, human factors engineering as it relates to warning about potential interactions, and various other issues related to DDIs. Myself and my research team have developed algorithms and written computer code to identify medication-related safety issues, especially as it relates to drug-drug interactions.

As a part of my research, I have purchased data files from Medi-Span (A drug knowledge database) and Drug Enforcement Agency (DEA) prescriber and pharmacy registration data from NTIS.

I have taught a required statistics course for pharmacists from 2004 to 2015, 2018-2019, at the University of Arizona. In addition, I taught an elective course in pharmacy informatics at the University of Arizona at various points in time from 2013 to 2018.

Issues Addressed

The scope of this expert review focusses on the technological capabilities of pharmacy organizations to provide useful information to pharmacists and pharmacy staff regarding potentially inappropriate of use opiate and other medications. The key questions this report addresses are was it possible using data available to chain pharmacy organizations to:

1. Conduct drug utilization analyses and provide meaningful metrics to assist pharmacists and pharmacy staff to identify and prevent inappropriate use of opiates and other medications both within and across pharmacies within their organization?;

2. Provide pharmacists with alerts/warnings about over-prescribing by certain licensed prescribers?;

3. Detect inappropriate prescribing and consumption using geospatial data analysis?;

4. Detect excessive dose and quantity accounting for prescriber specialty and practice?;

5. Identify potential pharmacy shopping by consumers seeking opiates and other medications?;

6. Identify use of drug combinations, so-called "Holy Trinity" using pharmacy data?; and

7. Detect overuse through early refills or new prescriptions?

Materials Reviewed:

CVS
RX2000 (old) and RxConnect are the names of CVS's Pharmacy Software

(1) testimony and exhibits from the deposition of CVS's designated "data" expert (located in a subfolder under William Boyd who was the deponent)
(2) an 1998 Internet article from CVS's corporate website on the $200 million CVS spent on it's first system
(3) a 2001 Internet article from ADT magazine on CVS's data warehouse
(4) a 2012 SAS program written by CVS's vendor AGI computing red flags from their dispensing data, see Bates: SAAGI00069454
(5) a 2012 CVS corporate PPT outlining Prescriber Red Flag Reports (ex: magnify pg 6), see Bates: CVS-MDLT3-000034324
(6) a 2013 CVS corporate PPT outlining all Red Flags used in their Enhanced Program (ex: see page 12), see Bates: CVS-MDLT3-000034325
(7) a 2013 CVS corporate PPT (see page 7 of the pdf), see Bates: CVS-MDLT1-000129873
(8) a 2014 SAS program written by CVS's vendor AGI computing red flags from their dispensing data, see Bates: CVS-MDLT1-000026070
(9) an article appearing in New England Journal of Medicine 2013: 269:11: see Bates: CVS-MDLT!-000000418

Walgreens
Intercom Connect Plus or IC+ is the name of Walgreens's Pharmacy Software

(1) testimony and exhibits from the deposition of Walgreens's designated "data" expert (located in a subfolder under Jon Arends who was the deponent)
(2) a 2010 Walgreens corporate PPT walking through the DUR screens in IC+, see Bates: WAGMDL00784104
(3) a 2013 Walgreens corporate PPT walking through the basic screens in IC+, see Bates: WAGMDL01166502

Walmart
ConnexUs is the name of Walmart's Pharmacy Software

(1) testimony and exhibits from the deposition of Walmart's designated "data" expert (located in a subfolder under Darren Townzen who was the deponent)
(2) a 2009 Walmart corporate manual on ConnexUs DUR process with screenshots, see Bates: WMT_MDL_000405150
(3) a 2010 Walmart corporate manual on ConnexUs updates with screenshots, see Bates: WMT_MDL_000418530
(3) a 2012 Walmart corporate PPT going through all the screens in ConnexUs, see Bates: WMT_MDL_000376862

[redacted]

Giant Eagle

PDX Classic or EPS or Enterprise Pharmacy Software is Giant Eagle's Pharmacy Software (from a 3rd party vendor called PDX)

(1) testimony and exhibits from the deposition of Giant Eagle's designated "data" expert (located in a subfolder under Christopher Miller who was the deponent)
(2) a manual circa 2011 on the Internet for PDX (downloaded in multiple parts - originally fromhttps://documentation.help/PDX-WorkstationConfig/documentation.pdf but no longer online)
(3) a 2008 Giant Eagle corporate PPT with some screenshots of the earlier PDX Classic system (ex: pages 69, 70 of the pdf), see Bates HBC_MDL00191107
(4) a 2019 Giant Eagle corporate document with screenshots of the DUR screen, see Bates HBC_MDL00191231

In addition to these materials, I reviewed the National Council for Prescription Drug Programs's (NCPDP) technical standard documentation called "Script V5.0". NCPDP is responsible for creating and maintaining data standards used by every pharmacy to file third-party claims to pharmacy benefit managers and various other data processors. Script Version 5.0 was implemented in approximately 2005 and the data elements relevant to this litigation have largely remained constant since then. Those data elements broadly include:

a. Pharmacy information
b. Patient and patient insurance information
c. Drug product information
d. Prescriber identification information
e. Pricing information

Because of the third-party programs, the data elements contained in this standard are collected and maintained by every pharmacy in the nation, although individuals state regulations and legislation may require additional data elements.

Evaluation of Key Questions

Drug Utilization Review at the Prescription Level: Each of the pharmacy organizations indicated in testimony that drug utilization review (DUR) analyses were conducted, often using data

provided by Medi-Span. DUR activities supported by such programs are largely based on medication-related attributes, such as chemical entity and strength. DDI warnings are specific to the unique product, so are drug-allergy, and drug-disease alerts. However, these vendors don't provide warnings based on aggregate prescription use or at the prescriber level. Algorithms by Medi-Span and First DataBank may account for age of the patient, known drug allergies, and conditions (i.e. diagnoses). Most DUR warnings are therefore not relevant to inappropriate opiate use. Additional data is required to assess so-called "red-flags."

Creating Opioid Specific "Red Flags": Each pharmacy organization (CVS, Giant Eagle, Rite Aid, Walgreens, and Walmart) had a mechanism to move store level prescription dispensing data to a central server or computer system that could have been used to assist pharmacists and pharmacy staff identify inappropriate opioid use. Red flags related to pharmacy shopping, doctor shopping, pattern prescribing, early fills/refills, and frequent cash payment could have been implemented within each organization using available data. It was well known by the early 2000's that there was an opioid prescription epidemic in our country. With the dispensing data on opioid dispensing accumulated in the central server or computer system, these pharmacy organizations had valuable information which could have been analyzed and communicated to the store level pharmacists as an important tool to identify red flags that only the nationally accumulated data would really reveal.

Walgreens was likely the first pharmacy to create a computer system that allowed remote storage of prescription drug dispensing information, going back to at least 1988. Because the information about the patient, prescriber, and medication were stored in identical formats across stores within the same organization, the analysis of this data was possible. Indeed, this data (excluding patient information) was often sold to other organizations (i.e., IMS Health/ IQVIA) to track physician prescribing habits and track utilization of every medication. IMS Health/IQVIA would sell reports based on this data to drug manufacturers who utilized the data to drive sales.

Based on depositions provided by representatives of the various pharmacy organizations, it is clear that this data was accessed to track pharmacy store performance and sometimes performance of specific individuals. Because of data standardization, analyses could have been performed using measures of variance to identify outlier behavior with respect to:

a. Quantity per prescription by medication product and strength
b. Days supply (anticipated duration of prescription)
c. Number of prescriptions written for opiate and other medications by prescriber
d. Evidence of doctor shopping by consumers
e. Distance from patient to provider
f. Distance from patient to pharmacy
g. Frequent fills or refills of opiate and other medications
h. Prior refusals to fill

Rationale for why each of these attributes were technically possible with existing data frameworks are discussed in detail below.

The number of unique prescriptions for specific products dispensed as an individual pharmacy is relatively low based on my previous research. Therefore, it is challenging for pharmacists to assess the degree of "excessive" quantity on a medication order for a given product. "Professional judgement" is highly variable when assessing medication orders/refills. However, it would have been easy for pharmacy organizations to provide dashboard statistics about measures of central tendency and dispersion for a given opioid medication based on prior prescriptions. In addition, given that the prescriber was known and linked to prescriber characteristics provided by Lexis/Nexus, data could be provided according to prescribers with the same credentials, specialty, and subspecialty. Extreme values for dose, duration, or morphine equivalents per prescription, such as top 5% or 1% could have been displayed to pharmacist's and pharmacy staff when evaluating a prescription order. These dashboard statistics could have been created for days supply as well. These measures would have provided pharmacists with near real-time "peer" data about what would be an appropriate vs. inappropriate medication order. It should be noted, that the earlier such a system would have been put in place, the more data would be accumulated and the algorithms run on the data would have increased the accuracy and validity of the red flags. This would have enhanced the tools for the pharmacists at the store level and likely would have prevented the dispensing of opioids that led to diversion.

Opioid prescribing is associated with prescriber specialty, with prescribers working in departments of emergency medicine (ERs) and urgent care facilities associated with greater percent of opioid prescriptions as compared to other specialists, such as a dermatologist. Each pharmacy organization had the necessary data elements to evaluate proportion of opioid prescriptions relative to other prescriptions by specialty and subspecialty to identify "outlier" prescribers. This information could have been provided to pharmacists and pharmacy staff when they were evaluating a prescription order for inappropriateness.

Data at the patient level that was linked across prescriptions could have been used to identify potential doctor shopping behavior by patients. While prescription drug monitoring programs (PDPM) aggregate across pharmacies, more real-time data could have been provided by pharmacy organizations to pharmacists and would be useful in jurisdictions where PDPM is not mandated or was slow to be mandated, or in pharmacy organizations where PDMP utilization was not mandated or compliance not monitored. Pharmacy chain organizations had data at their disposal that could have made it easier to identify consumers using multiple pharmacies within the same chain who were doctor shopping.

The geospatial analysis of prescription orders could have also been accomplished at the pharmacy chain level using programs like SAS (implemented by CVS) or other SQL programs to calculate the distance from the consumer to the pharmacy based on address or zip code. Data could have been summarized across all prescription orders dispensed to determine measure of central tendency and dispersion to assist pharmacists and pharmacy staff in identifying potentially inappropriate use. The same techniques could have also identified illogical distances between prescribers and patients, accounting for specialty and subspecialty care. In addition,

warnings based on geospatial analysis could have been configured based on local availability of prescribers (e.g. different maximum distances for urban vs. rural pharmacy locations).

The feasibility of the chain pharmacies to create the very systems I have described was ably described by the authors of an article published in the NEJM entitled "Abusive Prescribing of Controlled Substances-A Pharmacy View." The co-authors were employed by CVS.

Assessment of emerging inappropriate use through multiple medications could have been developed by each of the pharmacy organizations using existing data. While Medi-Span and drug knowledge bases have created DUR flags (similar to DDI warnings) for concomitant use of opioids, muscle relaxants, and benzodiazepines, it would have been possible for each organization to develop such algorithms independently. Admittedly, incorporation of such algorithms within "off-the-shelf" dispensing software such as PDX is more challenging than organizations who developed their own dispensing software systems. Because of Medi-Span and other drug knowledge databases, identification of products that would trigger such an alert can be based on therapeutic classifications. Also, algorithms can consider date ranges to determine if use is concurrent or not based on days supply. Finally, pharmacy organizations could have requested such algorithms be included in Medi-Span or other drug knowledge data vendors.

Finally, data on the frequency of fill and refill of opiates and other inappropriate medications could have been provided to pharmacists using dashboards to give pharmacists information on which to exercise their professional judgement about the legitimacy of dispensing a medication. Third-party insurance companies provide this information to pharmacies for prescriptions submitted for insurance coverage. Similar programs could have been implemented by pharmacy chain organizations for prescriptions not covered by insurance programs or not submitted for electronic adjudication.

Previous Expert Service

I have not provided a deposition or given trial testimony in any litigation in the previous 4 years.

Compensation Statement

My hourly compensation rate for expert evaluation is $380 per hour.

Summary

In summary, pharmacy chain organizations created, purchased, or aggregated data that could have been used to reduce the inappropriate use of opiates and other medications. The data elements required for the above activities has long resided (since at least 2006 and likely years

before that time) within databases and accumulation of such data across multiple pharmacies permitted the opportunity to inform pharmacists and pharmacy staff to potential illegitimate opioid use.

Daniel C. Malone, PhD, FAMCP

April 15th, 2021
Date

ATTACHMENT 1

Daniel C. Malone, PhD, FAMCP

Professor
Skaggs College of Pharmacy
University of Utah

Curriculum Vitae
March 2021

Office Address: Department of Pharmacotherapy, Skaggs College of Pharmacy
University of Utah

Phone: Office (801) 581-8054
Mobile (520) 481-2025

Email: dan.malone@utah.edu

Google Scholar: http://scholar.google.com/citations?user=ACzpckMAAAAJ&hl=en&oi=ao

EDUCATION

1993 - 1994	Post-Doctoral Fellow Agency for Health Care Policy and Research Sponsored Fellowship University of Washington School of Public Health and Community Medicine and School of Pharmacy Seattle, Washington
1993	The University of Texas at Austin Ph.D., Health Outcomes
1990	The University of Texas at Austin M.S., Health Outcomes
1987	University of Colorado B.S., Pharmacy (magna cum laude)

ACADEMIC APPOINTMENTS

10/19 to present	Professor, Department of Pharmacotherapy, Skaggs College of Pharmacy University of Utah
7/06 to 9/19	Professor, Department of Pharmacy Practice and Science, College of Pharmacy, The University of Arizona, Tucson, Arizona Associate Professor, College of Public Health
7/01 to 6/06	Associate Professor, Department of Pharmacy Practice and Science, College of Pharmacy, The University of Arizona, Tucson, Arizona
8/99 to 6/01	Assistant Professor, Department of Pharmacy Practice and Science, College of Pharmacy, The University of Arizona, Tucson, Arizona
10/94 to 8/99	Assistant Professor of Pharmacy, Department of Pharmacy Practice, University of Colorado Health Sciences Center, Denver, Colorado
6/93 to 9/94	Research Associate, School of Pharmacy, University of Washington, Seattle, Washington

PUBLICATIONS

Refereed Journal Articles

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Skora JL, Skrepnek GH, Armstrong EP, Malone DC. A cost-effectiveness analysis of treatment to low-density lipoprotein (ldl) cholesterol goal in high-risk patients based upon the 2004 national cholesterol education program (ncep) guideline update. International Society for Pharmacoeconomics and Outcomes Research, Toronto, Canada. May 5, 2008.

Smith KL, Ranger-Moore J, Mohler MJ, Armstrong EP, Skrepnek GH, Malone DC. Longitudinal decline of renal function in hypertensive veterans. International Society for Pharmacoeconomics and Outcomes Research, Toronto, Canada. May 6, 2008.

Hess LM, Coons SJ, Skrepnek G, Weihs K, Malone, DC. A pilot study of ovarian cancer patient preferences: empirical support for non-linear decision making

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Malone DC, Abarca J, Skrepnek GH, Murphy JE, Armstrong EP, Grizzle AJ, Rehfeld RA, Woosley RL. Pharmacist workload and pharmacy characteristics associated with the dispensing of potentially clinically important drug-drug interactions. International Society for Pharmacoeconomics and Outcomes Research, Crystal City, Virginia. May 21, 2007.

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Smith KL,Warholak-Jackson T, Malone DC, Armstrong EP, Rehfeld RA. Evaluation of risk factors and predictors of health outcomes among persons with asthma. International Society for Pharmacoeconomics and Outcomes Research, Crystal City, Virginia. May 21, 2007.

Ko Y, Malone DC, D'Agostino JV, Skrepnek GH, Armstrong EP, Brown M, Rehfeld RA, Abarca J, Woosley RL. An application of item response theory to prescribers' knowledge and attitude measurement. International Society for Pharmacoeconomics and Outcomes Research, Crystal City, Virginia. May 21, 2007.

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Daniel GW, Malone DC. Characteristics of seniors with high annual prescription drug expenditures: findings from the 2002 and 2003 Medical Expenditure Panel Survey. International Society for PharmacoEconomics and Outcomes Research Annual meeting, May 23, 2006.

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Malone DC. Mahmood M. Evaluating the difference between average wholesale price and wholesale acquisition cost for pharmaceuticals in the United States. International Society for PharmacoEconomics and Outcomes Research European meeting, November 6, 2005.

Bhandary D, Malone DC. An evaluation of pharmaceutical prices under the pharmaceutical federal supply schedule. International Society for PharmacoEconomics and Outcomes Research Annual Meeting, May 17, 2005. *Value in Health* 2005; 8:243.

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Skrepnek GH, Abarca J, Malone DC, Armstrong EP, Shirazi FM, Woosley RL. Incremental effects of concurrent pharmacotherapeutic regimens for heart failure on hospitalizations and costs. International Society for PharmacoEconomics and Outcomes Research Annual Meeting, May 16, 2005. *Value in Health* 2005; 8:265.

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Perkins NA, Malone DC, Armstrong EP, Murphy JE. Performance of drug-drug interaction software for personal digital assistants. American Society of Health-Systems Pharmacists Midyear Clinical Meeting, December 7, 2004

Colon L, Armstrong EP, Malone DC, Murphy JE. Evaluation of drug interaction screening software programs in community pharmacies in Tucson, Arizona. American Society of Health-Systems Pharmacists Midyear Clinical Meeting, December 8, 2004

Malone DC, Ward S, Gesser K. A cost-effectiveness analysis of treating open angle glaucoma. International Society for Pharmaceutical Outcomes and Research 9th Annual International Meeting, Alexandria, VA, May 16, 2004

Skrepnek GH, Armstrong EP, Malone DC, Ramanchandran S. An economic and clinical assessment of first-line monotherapy in the treatment of community-acquired pneumonia within managed care. International Society for Pharmaceutical Outcomes and Research 9th Annual International Meeting, Alexandria, VA, May 17, 2004

Joish VN, Malone DC, Wendal C, Mohler MJ. Validation of the diabetes resource consumption index (DRCI): a risk adjustment tool for predicting health care resource use and costs. International Society for Pharmaceutical Outcomes and Research 9th Annual International Meeting, Alexandria, VA, May 17, 2004

Joish VN, Malone DC, Wendal C, Mohler MJ. Development of a diabetes resource consumption index (DRCI) using veterans health administration data. International Society for Pharmaceutical Outcomes and Research 9th Annual International Meeting, Alexandria, VA, May 17, 2004

Stoplman NM, Valuck RJ, Lezotte D, Malone DC, Glazner J, Everson GT. A pharmacoeconomic assessment of the benefits and costs of managing immunosuppression in post-liver transplant patients: a university hospital perspective. International Society for Pharmaceutical Outcomes and Research 9th Annual International Meeting, Alexandria, VA, May 17, 2004

Wanke LA, Chiou CF, Reyes E, Malone DC, Woolley M. Cost-efficacy comparison of biologics used to treat psoriasis. Society of Investigational Dermatology Annual Meeting, Providence, Rhode Island, April 29, 2004.

Malone DC, Abarca J, Skrepnek G, Rehfield R, Armstrong EP, Murphy JE, Grizzle AJ, Woosley R. *Community pharmacists' perceptions of computerized drug-drug interaction alerts*. American Pharmaceutical Association Annual Meeting, March 28, 2004. Journal of the American Pharmacists Association 2004; 44: 279.

Malone DC, Poulios N, Li-McLeod J. Evaluation of influenza substrates distributions for use in economic models evaluating influenza vaccines. Drug Information Association Pharmaceutical Outcomes Research Conference, Tucson Arizona, January 18, 2004.

Abarca J, Malone DC, Armstrong EP, Grizzle AJ, Rehfeld R, Cohen MD. Drug Use Evaluation of TNF-α Inhibitors in the Treatment of Rheumatoid Arthritis in Routine Clinical Practice in the US. American College of Rheumatology Annual Meeting. Orlando, Florida, October 25, 2003.

Chiou CF, Wanke LA, Reyes C, Malone DC, Ortmeier B, Ofman JJ, Weisman M. Biologics in Rheumatoid Arthritis: Cost-Efficacy Based on Clinically Meaningful Improvement in Health Assessment Questionnaire Scores. American College of Rheumatology Annual Meeting. Orlando, Florida, October 25, 2003.

Chiou CF, Wanke LA, Reyes C, Malone DC, Ortmeier B, Ofman JJ, Weisman M. Comparison of the Cost-Efficacy of Biologics in the Treatment of Rheumatoid Arthritis. American College of Rheumatology Annual Meeting. Orlando, Florida, October 25, 2003.

Singh A, Wanke LA, Malone DC, Ortmeier BG. Cost-Efficacy Comparison of Adalimumab and Etanercept in the Treatment of Rheumatoid Arthritis. American College of Rheumatology Annual Meeting. Orlando, Florida, October 26, 2003.

Chiou CF, Wanke LA, Reyes C, Malone DC, Ortmeier BG, Ofman J, Weisman M. A cost-efficacy comparison of biologic agents in the treatment of rheumatoid arthritis. Annual European Congress of Rheumatology. Lisbon Portugal, June 21, 2003.

Malone DC, Ortmeier BG. Cost-effectiveness analysis of etanercept versus infliximab in the treatment of rheumatoid arthritis. Annual European Congress of Rheumatology. Lisbon Portugal, June 21, 2003.

Malone DC, Singh A, Wanke LA, Ortmeier BG. A cost-efficacy comparison of adalimumab and etanercept in treatment of rheumatoid arthritis. Annual European Congress of Rheumatology. Lisbon Portugal, June 21, 2003.

Malone DC, Singh A, Wanke LA, Ortmeier BG. A cost-efficacy comparison of adalimumab and etanercept in treatment of rheumatoid arthritis. Annual European Congress of Rheumatology. Lisbon Portugal, June 21, 2003.

Malone DC, Gardner ME, Babington MA, Sey M. Drug use evaluation of mirtazepine in nursing facility residents: impact on use of concomitant medications. American Geriatrics Society Annual Meeting, Baltimore, MD, May 16, 2003.

Armstrong EP, Zachry III WM, Malone DC. Cost-effectiveness analysis of simvastatin and lovastatin/extended-release niacin to achieve LDL and HDL goal using NHANES data. International Society for Pharmaceutical Outcomes and Research 8th Annual International Meeting, Alexandria, VA, May 20, 2003.

Olson BM, Malone DC. Consumer understanding and satisfaction associated with a three-tier prescription drug benefit. Academy of Managed Care Pharmacy Annual Meeting, Minneapolis, MN, April 11, 2003. *Awarded Best Student/fellow Poster Prize

White TJ, Chang E, Fontes C, Berenbeim D, Malone DC. An analysis of the relationship between initial asthma medication selected and total cost of care. Academy of Managed Care Pharmacy Annual Meeting, Minneapolis, MN, April 11, 2003

Malone DC, Gardner ME, Babington MA, Sey M. Drug use evaluation of mirtazepine in nursing facility residents: impact on use of concomitant medications. American Society of Consultant Pharmacists Annual Meeting, Anaheim, California, November 14, 2002.

Lackner TE, Heard T, Glunz S, Gann N, Babington M, Malone DC. Gastrointestinal disease control after histamine$_2$-receptor antagonist dose modification for renal impairment in frail chronically-ill elderly patients (encore presentation). American Society of Consultant Pharmacists Annual Meeting, Anaheim, California, November 15, 2002.

Yalkowsky R, Malone DC. Cost-effectiveness of triptan therapy in treatment of migraine. ISPOR European Meeting. Rotterdam, Holland. November 5, 2002.

Malone DC, Ortmeier BG. Cost effectiveness analysis of etanercept versus infliximab in the treatment of rheumatoid arthritis. American College of Rheumatology Annual Meting. New Orleans, Louisiana. October 27, 2002.

Malone DC, Ortmeier BG. Cost-efficacy of etanercept versus infliximab plus methotrexate in the treatment of DMARD-resistant rheumatoid arthritis. Annual European Congress of Rheumatology. Stockholm, Sweden, June 15, 2002.

Malone DC, Ortmeier BG. Cost-efficacy of etanercept versus infliximab plus methotrexate in rheumatoid arthritis based upon radiographic data. Annual European Congress of Rheumatology. Stockholm, Sweden, June 15, 2002.

Abarca, J, Malone DC, Armstrong EA. The effect of beta-blocker and ace inhibitor therapy on the risk of hospitalization and resource utilization among patients with chf enrolled in a managed care organization. International Society for Pharmacoecnomic and Outcomes Research 7th Annual meeting. Crystal City, Virginia. May 20, 2002. *Value in Health* 2002; 5(3):170 (abstract).

Zachry W, Jackson T, Malone D. Prescriber behavioral intentions associated with patient disease state and clinician type. American Pharmaceutical Association Annual Meeting. Philadelphia, Pennsylvania, March 18, 2002. Journal of the American Pharmaceutical Association 2002; 42(2):328 (abstract).

GRANTS

Principal investigator is listed first.

Federal

Title: Enabling Shared Decision Making to Reduce Harm from Drug Interactions: An End-to-End Demonstration

Source:	Agency for Healthcare Research and Quality -
Dates:	9/30/19 to 9/29/21
Investigators:	Malone, Boyce, Del Foils, Kawamoto, Weir
Role:	Principal Investigator
Amount:	$995,341
Percent Effort:	20%

Title:	Dissemination and Implementation of QT Risk Clinical Decision Support
Source:	Agency for Healthcare Research and Quality -1R18HS0266662-01
Dates:	4/1/19 to 3/31/21
Investigators:	Malone, Antonescu, Bedrick, Heise, Gallo, Gephart, Tisdale, Woosley
Role:	Principal Investigator
Amount:	$776,430
Percent Effort:	20%

Title:	Meaningful Drug Interaction Alerts
Source:	Agency for Healthcare Research and Quality –1R01HS025984-01
Dates:	5/1/18 to 2/28/22
Investigators:	Malone, Gephart, Subbian, Boyce
Role:	Principal Investigator
Amount:	$1,589,749
Percent Effort:	23%

Title:	Addressing gaps in clinically useful evidence on drug-drug interactions
Source:	National Library of Medicine – 5R01NLM011838-04
Dates:	2/15/14 to 2/15/18
Investigators:	Boyce, Malone,
Role:	Co-Investigator
Amount:	$1,600,000
Percent Effort:	10%

Title:	Depression Treatment and Outcomes Among Older Adults with Dementia in the United States.
Source:	National Institute of Mental Health -1R03MH114503-01
Dates:	7/1/2017 to 6/30/2019
Investigators:	Bhattachariee, Malone, Warholak, Lo-Ciganic
Role:	Co-Investigator
Amount:	$153,500
Percent Effort:	1%

Title:	Using Machine Learning to Predict Problematic Opioid Use.

Source:	National Institute for Drug Abuse - 1R01DA044985-01
Dates:	9/1/2017 to 6/20/2020
Investigators:	Gellad, Lo-Ciganic, Kwoh, Donohue, James, Calhoun, Cochran, Gordon, Malone, Zhu, Zhang
Role:	Co-Investigator
Amount:	$825,427
Percent Effort:	3%

Title:	Individualized Drug Interaction Alerts
Source:	Agency for Health Care Research Quality -1R21 HS023826-01
Dates:	7/1/2015 to 6/30/2017
Investigators:	Malone, Hines, Boyce,
Role:	Principal Investigator
Amount:	$299,830
Percent Effort:	20%

Title:	Clinical Decision Support Optimizing NEC Prevention and Early Recognition
Source:	Agency for Health Care Research Quality - K08 HS22908-01A1
Dates:	9/30/14 to 9/29/19
Investigators:	Gephart, Malone, Greenes, Titler, Bell, Shuffitt
Role:	Primary Mentor
Amount:	$702,920
Percent Effort:	No support for mentors allowed

Title:	Drug-Drug Interaction Clinical Decision Support Conference Series
Source:	Agency for Health Care Research Quality -1R13HS021826-01
Dates:	9/30/12 to 9/29/15
Investigators:	Malone, Hines
Role:	Principal Investigator
Amount:	$287,596 plus $40,000 from drug knowledge vendors
Percent Effort:	5%

Title:	Mining Social Network Postings for Mentions of Potential Adverse Drug Reactions
Source:	National Library of Medicine -1R01LM011176-01
Dates:	9/10/12 to 8/31/16
Investigators:	Gonzalez, Malone, Smith, Pettiti
Role:	Co-Investigator
Amount:	$1,408,499
Percent Effort:	5%

Title:	Innovation Diffusion of Comparative Effectiveness Research
Source:	Agency for Health Care Research Quality - 1R18 HS 19220-01 01
Dates:	9/30/10 to 9/29/12
Investigators:	Malone, Warholak, Hines, Brixner, Cobaugh, Schlaiffer
Role:	Principal Investigator
Amount:	$1,250,153
Percent Effort:	15%

Title:	Epidemiologic follow-up study of newly diagnosed epilepsy among seniors from different ethnic groups
Source:	Centers for Disease Control and Prevention
Dates:	9/30/10 to 9/29/14
Investigators:	Labiner, Chong, Malone, Kudrimoti, Drake, Denninghoff, Harris, Malone, Fain, Reinschmidt, LaFleur
Role:	Co-Investigator
Amount:	$1,600,000
Percent Effort:	5%

Title:	Home-based Cancer Symptom Management.
Source:	Caracal, Inc. (Subcontract from NIH – 5R43MD011210-02
Dates:	9/15/10 to 11/30/13
Investigators:	Lopez, Krupinski, Malone
Role:	Co-Investigator
Amount:	$648,930
Percent Effort:	Varying 4% to 7%

Title:	Generating, Evaluating, and Implementing Evidence for Drug-Drug Interactions in Health Information Technology to Improve Patient Safety: A Multi-Stakeholder Conference.
Source:	Agency for Health Care Research Quality -1R13HS018307-01
Dates:	8/1/09 to 7/31/11
Investigators:	Malone, Hines, Grizzle, Murphy,
Role:	Principal Investigator
Amount:	$50,000 plus $22,000 from Drug Knowledge Database Vendors
Percent Effort:	20%

Title:	Arizona Center for Education and Research on Therapeutics
Source:	Agency for Health Care Research Quality - U18 HS017001-01
Dates:	9/1/07 to 8/31/11
Investigators:	Core Investigators: Woosley, Malone, Anthony, Warholak, Armstrong, Murphy, Reel, Sherrill, Romero
Role:	Co-Investigator and Director of Pharmaceutical Outcomes Core
Amount:	$3,958,568
Percent Effort:	20%

Title:	Center for Education and Research on Therapeutics
Source:	Agency for Health Care Research Quality -U18 HS10385-05
Dates:	9/30/02 to 9/29/07
Investigators:	Woosley, Malone, Campbell, Johnson
Role:	Co-Investigator
Amount:	$3,988,451
Percent Effort:	28%

Title:	Clinical Importance of Drug-Drug Interactions
Source:	National Institute of Aging – 5R01AG025152-01

Dates: 9/30/07 to 9/29/10
Investigators: Hennessey, Strom, Horn, Malone
Role: Co-Investigator
Amount: $3,707,071
Percent Effort: 5%

Title: CERT - Community Pharmacy Safety Network
Source: Agency for Health Care Research Quality (supplement to U18 HS10385-05)
Dates: 9/30/05 to 9/29/06
Investigators: Woosley, Malone, Abarca, Brown, Armstrong, Murphy, Reel.
Role: Co-Investigator
Amount: $142,798
Percent Effort: 2%

Title: Enhancing the monitoring of pharmaceutical services and patient safety through connectivity
Source: Centers for Disease Control and Prevention
Dates: 9/25/01 to 9/30/02
Investigators: Lipton, Malone, Grizzle, Duncan, Armstrong
Role: Co-Principal Investigator
Amount: $195,417
Percent Effort: 30%

Title: Enhancing the monitoring of pharmaceutical services and patient safety through connectivity – Year 2 continuation
Source: Centers for Disease Control
Dates: 9/25/02 to 9/30/03
Investigators: Lipton, Malone, Grizzle, Duncan, Armstrong
Role: Co-Principal Investigator
Amount: $286,228
Percent Effort: 12%

Title: The Arizona Targeted Research Enhancement Program
Source: Department of Veterans Affairs – HSR&D Service
Dates: 7/1/03 to 6/30/04
Investigators: Ampel, Mohler, Babcock, Malone, Jones, Chen.
Role: Co- Investigator
Amount: $130,000
Percent Effort: 20%

State

Title:
Source: Arizona Health Care Cost Containment System
Dates: 7/1/19 to 6/30/21
Investigators: Trinkley, Malone,
Role: Co-Principal Investigator
Amount: $183,867
Percent Effort: 10%

Title: Medicaid Transformation III Grant: Value Driven Decision Support Tool Box.
Source: Arizona Health Care Cost Containment System
Dates: 1/8/08 to 6/30/09
Investigators: Malone, Warholak
Role: Co-Principal Investigator
Amount: $183,867
Percent Effort: 10%

Title: Interagency Agreement Between AHCCCS and the HOPE Center
Source: Arizona Health Care Cost Containment System
Dates: 07/01/07 to 07/01/08
Investigators: Malone, Warholak
Role: Principal Investigator
Amount: $104,900
Percent Effort: 20%

Title: Psychotropic Medication Use in Children
Source: Arizona Health Care Cost Containment System
Dates: 4/15/07 to 7/16/07
Investigators: Malone, Warholak
Role: Principal Investigator
Amount: $28,871
Percent Effort: 10%

Title: Interagency Agreement Between AHCCCS and the HOPE Center
Source: Arizona Health Care Cost Containment System
Dates: 06/01/05 to 06/01/07
Investigators: Malone
Role: Principal Investigator
Amount: $51,218
Percent Effort: 10%

Title: Colorado Cost of Dispensing Study
Source: Colorado State Department of Health Care Policy and Financing
Dates: 02/01/96 to 8/31/96
Investigators: Malone, Valuck
Role: Co-Principal Investigator
Amount: $37,477
Percent Effort: 40%

Foundations/ Non-profit:

Title: Use of Real World Evidence to Support Drug Coverage Decisions
Source: National Pharmaceutical Council
Dates: 6/1/15 to 5/18/17
Investigators: Malone, Brown, Hurwitz
Role: Principal Investigator

Amount:	$123,220
Percent Effort:	10%

Title:	The good, the bad, and the different: deciphering heterogeneity for managed care pharmacy and medical directors
Source:	National Pharmaceutical Council
Dates:	1/1/12 to 6/30/13
Investigators:	Malone, Warholak, Hines
Role:	Principal Investigator
Amount:	$205,434
Percent Effort:	15%

Title:	Predictive modeling using medication-based indicators for patient care management
Source:	University of Arizona Health Network
Dates:	6/1/11 to 5/31/12
Investigators:	Malone
Role:	Principal Investigator
Amount:	$55,363
Percent Effort:	5%

Title:	Evaluation of intraperitoneal vs. intravenous administration of cisplatin-based chemotherapy regimens for the treatment of ovarian cancer
Source:	University of Arizona Better than Ever Small faculty grant program
Dates:	7/1/04 to 6/30/05
Investigators:	Hess, Malone
Role:	Co-investigator
Amount:	$38,492
Percent Effort:	5%

Title:	Development of a chronic disease indicator using pharmacy data from a managed care organization
Source:	American Association of Colleges of Pharmacy 1999-2000 New Investigators Program
Dates:	1/1/2000 to 1/31/2001
Investigators:	Malone
Role:	Principal Investigator
Amount:	$9,834
Percent Effort:	5%

Title:	Establishing the Division of Pharmaceutical Policy to promote informed policy development and evaluation
Source:	The Merck Company Foundation
Dates:	1/01/00 to 12/31/03
Investigators:	Bootman, Armstrong, Coons, Cox, Grizzle, Malone, Motheral
Role:	Co-Investigator
Amount:	$600,000
Percent Effort:	15%

Title:	Comparison of lovastatin, fluvastatin and pravastatin
Source:	Research Institute of the American College of Clinical Pharmacy
Dates:	7/1/99 to 6/30/00
Investigators:	Saseen, Follin, Malone, Donahoo
Role:	Co-Investigator
Amount:	$10,000
Percent Effort:	5%

Title:	A controlled study of pharmacy intervention for hyperlipidemic patients in a managed care setting
Source:	National Pharmacy Cholesterol Council
Dates:	1/97 to 12/97
Investigators:	Barnette, Erin Burke, Malone, Price
Role:	Co-Investigator
Amount:	$12,644
Percent Effort:	5%

Title:	Academia oriented springboard to teaching fellowship in pharmacy administration
Source:	American Foundation for Pharmaceutical Education
Dates:	8/92 to 10/96
Investigators:	Malone
Role:	Principal Investigator
Amount:	$22,500
Percent Effort:	Not specified – unrestricted startup funds

Corporations / Pharmaceutical Industry/ Other For-Profit Entities

Title:	An evaluation of the evidence for medication conflicts that may result in adverse drug events
Source:	Humana
Dates:	2/1/09 to 12/31/09
Investigators:	Malone
Role:	Principal Investigator
Amount:	$37,534
Percent Effort:	5%

Title:	Medicaid asthma burden of illness study
Source:	MedTap UnitedBiosource
Dates:	11/1/05 to 3/31/06
Investigators:	Jackson, Malone, Armstrong, Skrepnek,
Role:	Co-investigator
Amount:	$52,500
Percent Effort:	5%

Title:	An Analysis of the Clinical and Economic Consequences of Disease Management Programs for the Treatment of Schizophrenia and Diabetes

Source:	Eli Lilly
Dates:	7/1/04 to 6/30/05
Investigators:	Skrepnek, Armstrong, Malone
Role:	Co-investigator
Amount:	$125,044
Percent Effort:	5%

Title:	Upper Gastrointestinal Bleeding Associated With The Use Of ASA And Other Non-Steroidal Anti-Inflammatory Drugs
Source:	TAP Pharmaceuticals
Dates:	10/1/02 to 10/1/03
Investigators	Lackner, Malone, Babbington
Role:	Co-Investigator
Amount:	5%
Percent Effort:	$85,000

Title:	An analysis of the impact of extended-release niacin in combination with HMG-coA reductase inhibitors for the treatment of high serum cholesterol
Source:	KOS Pharmaceuticals
Dates:	1/10/02 to 6/1/03
Investigators:	Armstrong, Zachry, Malone
Role:	Co investigator
Amount:	$99,213
Percent Effort:	7%

Title:	An analysis of the impact of inhaled corticosteroids versus leukotrienes on managed care costs for persons with asthma
Source:	Glaxo Wellcome, Inc.
Dates:	9/1/00 to 3/1/01
Investigators:	Armstrong, Malone
Role:	Co-Investigator
Amount:	$90,194
Percent Effort:	25%

Title:	An exploratory analysis of factors associated with early patient withdrawal from chemotherapy treatment
Source:	Amgen
Dates:	3/1/00 to 9/30/00
Investigators:	Malone, Grizzle
Role:	Principal Investigator
Amount:	$64,664
Percent Effort:	20%

Title:	Changes in utilization of and compliance with prescription medications after reaching 60 percent of a capped prescription benefit
Source:	The Merck Company
Dates:	4/01/00 to 6/30/00
Investigators:	Malone, Joish

Role:	Principal Investigator
Amount:	$7,074
Percent Effort:	5%

Title:	Use of selective serotonin reuptake inhibitors in Veterans Affairs Medical Centers
Source:	Pharmacia and Upjohn
Dates:	6/4/99 to 8/31/99
Investigators:	Malone, Valuck
Role:	Principal Investigator
Amount:	$23,742
Percent Effort:	20%

Title:	Evaluation of clinical, humanistic, and economic effectiveness of Meridia® within a weight management program in a managed care environment
Source:	Knoll Pharmaceuticals
Dates:	12/1/98 to 12/31/01
Investigators:	Porter, Raebel, Huttenhower, Lanty, Malone, Menerich, Butler, Gray, Williams, Nguyen
Role:	Co-Investigator
Amount:	$755,159
Percent Effort:	5%

Title:	Treatment of urinary incontinence in Veteran Affairs Medical Centers
Source:	Pharmacia and Upjohn
Dates:	2/01/98 to 8/31/98
Investigators:	Malone, Okano
Role:	Principal Investigator
Amount:	$29,282
Percent Effort:	20%

Title:	The cost of allergic rhinitis and asthma in the United States, continuation of studies
Source:	Glaxo Wellcome
Dates:	4/01/97 to 8/31/98
Investigators:	Malone, Lawson, Smith
Role:	Principal Investigator
Amount:	$25,814
Percent Effort:	15%

Title:	Outcomes of helicobacter pylori eradication therapy in nursing home patients on maintenance histamine$_2$-receptor antagonists for duodenal ulcer
Source:	Glaxo-Wellcome, Meretek, and PharMerica
Dates:	11/97 to 12/99 (study stopped due to lack of patient recruitment)
Investigators:	Lackner, Malone, Ganz, Marti
Role:	Co-Investigator
Amount:	$76,000
Percent Effort:	15%

Title:	Development of drug specific drug interaction DUR criteria
Source:	The United States Pharmacopeial Convention, Inc.
Dates:	01/01/97 to 03/31/98
Investigators:	Valuck, Malone, Weiss
Role:	Co-Investigator
Amount:	$150,000
Percent Effort:	5%

Title:	Histamine$_2$-receptor antagonist dose modification in renal impairment outcomes trial
Source:	Eli Lilly and Company
Dates:	11/01/96 to 12/31/98
Investigators:	Lackner, Malone, Walker-Renard, Babington
Role:	Co-Investigator
Amount:	$86,600
Percent Effort:	15%

Title:	Implementation of pharmaceutical care in VA hospitals utilizing managed care principles
Source:	Veterans Affairs Pharmacy and Pharmacia and Upjohn (competitive peer-reviewed)
Dates:	02/01/96 to 12/31/98
Investigators:	Carter, Malone, Barnette, Sintek, Valuck
Role:	Co-Principal Investigator
Amount:	$591,285 ($291,285 to University of Colorado and $300,000 for research assistants in VA Medical Centers)
Percent Effort:	20%

Title:	The costs of allergic rhinitis and asthma in the United States
Source:	Glaxo-Wellcome
Dates:	4/01/95 to 8/31/96
Investigators:	Malone, Lawson, Smith
Role:	Principal Investigator
Amount:	$55,313
Percent Effort:	15%

Title:	A clinical and economic comparison of Adalat CC® and Procardia XL® in hypertensive long-term care patients
Source:	Bayer Corporation
Dates:	11/01/94 to 06/01/96
Investigators:	Malone, Babington
Role:	Principle Investigator
Amount:	$4,347
Percent Effort:	5%

Title:	A non-restricted grant to develop a pharmacoeconomic protocol for community acquired pneumonia
Source:	Pfizer Pharmaceuticals
Dates:	2/01/95 to 6/31/95

Investigators:	Malone, Bendale, Mogyoros
Role:	Principal Investigator
Amount:	$22,680
Percent Effort:	10%

Title:	A pharmacoeconomic analysis of PIXY321
Source:	Immunex Corporation
Dates:	4/01/93 to 4/01/96
Investigators:	Stergachis, Sullivan, Black, Malone
Role:	Co-Investigator
Amount:	$210,418
Percent Effort:	30%

Title:	A randomized, double-blinded pharmacoeconomic evaluation of triamcinolone acetonide
Source:	Rhone-Poulenc Rorer Pharmaceuticals, Inc.
Dates:	8/01/93 to 12/31/98
Investigators:	Sullivan, Lessler, Malone, Malter, Schulz, Perrin
Role:	Co-Investigator
Amount:	$340,134
Percent Effort:	15%

PROFESSIONAL ACTIVITIES

Intramural (since 1999)

Department Committees Duties

Promotion and Tenure committee, July 2017 to September 2019.

Peer Review committee (elected by faculty), January 2013 to June 2015.

Co-Chair, Pharmacy Practice and Science Faculty Search Committee, June 2012 to August 2013.

Member, Graduate Studies in Pharmaceutical Economics Outcomes, and Policy committee, September 1999 to present.

Member, Tucson-Phoenix Roadmap Committee, August 2008 to June 2012.

Chair, Graduate Studies in Pharmaceutical Economics, Outcomes, and Policy committee, September 2006 to June 2008.

Chair, Graduate Studies in Pharmaceutical Economics, Outcomes, and Policy committee, July 2004 to August 2005.

Chair, Graduate Studies in Pharmaceutical Economics and Administrative Sciences committee, January 2001 to December 2001.

Peer Review committee (elected by faculty), January 2000 to December 2001.

Member, Social Committee, September 1999 to December 2000.

Member, Pharmacy Administration Faculty Search Committee, February 2000 to June 2000.

College Committees / Duties

Member, PharmD project committee, Octoboer 2019 to present

Faculty Advisor, Academy of Managed Care Pharmacy University of Arizona Student Chapter, June 2016 to August 2019.

Member, Faculty Status Committee (Promotion and Tenure), August 2016 to June 2017.

Faculty Mentor for Dr. Jenny Lo-Ciganic, January 2015 to June 2018.

Member, Curriculum Committee, June 2014 to September 2016.

Member, Research Committee, September 2009 to 2017.

Chair, Faculty Status Committee (Promotion and Tenure), September 2007 to August 2009.

Member, Phoenix Expansion Task Force, September 2004 to August 2006.

Member, Graduate Program Committee, July 2004 to August 2005.

Member, Department Head Search Committee, November 2003 to March 2005.

Member, Executive Committee, September 2004 to 2006.

Member, ACPE Accreditation Self-Study Committee, March 2003 to December 2003.

Member, Curriculum Committee, August 1999 to September 2004.

Director, Division of Pharmaceutical Policy, Center for Health Outcomes and PharmacoEconomic Research. June 2000 to August 2012.

Faculty mentor for Terri Warholak. June 2007 to August 2013.

Center for Health Outcomes and PharmacoEconomic Research January Conference planning committee, 2000, 2001, 2002, 2003, 2004, 2005, and 2006.

Faculty advisor, Phi Delta Chi professional pharmacy fraternity, January 2002 to January 2004 and June 2007 to present.

Faculty advisor, Rho Chi Honorary Society, May 2001 to August 2005, September 2006 to May 2010.

Faculty mentor for Grant Skrepnek, January 2002 to September 2005.

Co-Preceptor, Managed Care Residency with AdvancePCS, 2003-2004.

University Service

Member, Campus Data Management Committee, September 2012 to June 2018

Member, Committee on Conciliation, 2014

Member, Data Management Advisory Committee, May 2011 to February 2012

Extramural

Special Advisor to Board of Directors, International Society for Pharmacoeconomic and Outcomes Research. July 1, 2017 to present.

Immediate Past-President, International Society for Pharmacoeconomic and Outcomes Research. July 1, 2016 to June 30, 2017.

President, International Society for Pharmacoeconomic and Outcomes Research. July 1, 2015 to June 30, 2016.

President-Elect, International Society for Pharmacoeconomic and Outcomes Research. July 1, 2014 to June 30, 2015.

Board of Directors, International Society for Pharmacoeconomic and Outcomes Research. July 1, 2014 to June 30, 2017.

Board of Directors, Credible Meds, July 1, 2014 to present.

American Society for Health-Systems Pharmacists Section Advisory Group Clinical Information Systems, September 2012 to June 2015.

Study Section, ASHP Foundation, Pharmacy Practice Model Initiative, 2012 to 2015.

Co-Chair, Best Paper Awards Committee, International Society for Pharmacoeconomic and Outcomes Research Awards Committee – 2013.

Foundation for Managed Care Pharmacy Executive Committee for the AMCP Format for Formulary Submissions, October 2008 to March 2018.

Study Section, Training Programs in Comparative Effectiveness Research, PhRMA Foundation, 2011 to present.

Academy of Managed Care Pharmacy eDossier Oversight Committee. January 2010 to January 2012.

Advisory Committee Member – Office of the National Coordinator – Clinically Important Drug-Drug Interactions, September 2010 to December 2010.

Board of Directors, Pharmacy and Therapeutics Society, January 2007 to December 2012.
Chair, Education committee for P&T Society, January 2009 to December 2012.
Secretary – June 2010 to December 2012.

Annual Meeting Program Chair, International Society for Pharmacoeconomic and Outcomes Research, May 2009 to May 2010.

Member, SIG on Personalized Medicine, International Society for Pharmacoeconomic and Outcomes Research, May 2009 to present.

Member, SIG on Indirect Treatment Comparisons, International Society for Pharmacoeconomic and Outcomes Research, May 2009 to March 2010.

Member, Pharmacy Practice Research Alliance Planning Committee for Medication Use Conference, January 2009 to December 2010.

Chairman, International Society for Pharmacoeconomic and Outcomes Research Awards Committee, December 2005 to June 2008.

Member, American Association of Colleges of Pharmacy Committee on Practice-Based Research Networks, October 17, 2005.

Member, Board of Directors, AMCP Horizons. October 2003 to April 2006.

Chairman, International Society for Pharmacoeconomics and Outcomes Research Distance Learning Evaluation Task Force, January 2004 to January 2007.

Member, American Association of Colleges of Pharmacy Research and Graduate Affairs Committee, September 2004 to June 2005.

Member, International Society for Pharmacoeconomic and Outcomes Research PBM Research Subcommittee. June 2002 to June 2004.

Member, International Society for Pharmacoeconomic and Outcomes Research PBM Sig Organization Bridge Building Subcommittee, June 2002 to June 2003.

Member, Editorial Advisory Board for the *Journal of Managed Care Pharmacy*, 2001 to 2004 and 2005 to 2007.

Member, Editorial Advisory Board for *Clinical Therapeutics*, January 2001 to December 2008.

Member, Southern Arizona Veterans Affairs Health Care System Research Committee, March 2001 to March 2004.

Member, Pharmacoeconomic Study Team, Kaiser Permanente, January 1998 to May 2001.

Study Section, Agency for Health Care Research and Quality, Health Services Research, March 2001.

Study Section, National Patient Safety Foundation, a division of the American Medical Association, April 2000.

Seminars (Since 2006)

Issues of Drug Interaction Detection in the United States. Mediseen+, Tel Aviv, Israel, May 8, 2018.

Multiple Criteria Decision Analysis: Potential Implications to Formulary Decision-Making. AMCP Annual Meeting, Boston, MA, April 25, 2018.

Drug Interaction Clinical Decision Support – Mending the Safety Net. Grand Rounds, University of Arizona College of Medicine, Phoenix, AZ, April 20, 2018.

Pharmaceutical Value Frameworks, La Jolla Pharmaceuticals, San Diego, CA, February 8, 2018.

Pharmaceutical Pricing. University of Wyoming School of Pharmacy seminar. Laramie WY, October 13, 2017.

Pharmaceutical Pricing Turmoil: Where's the Value to My System. Health Trust University Annual Meeting, Las Vegas, NV, July 17, 2017.

Why Pharmaceutical Prices are Out of Control: Policy Options for Sustainable and Affordable Products. University of Arkansas College of Pharmacy, Little Rock, AK, April 27, 2017.

Global View of Value Assessment Frameworks: How Does AMCP Format 4.0 Compare? Academy of Managed Care Pharmacy Annual Meeting, March 26, 2017.

Understanding FDAMA Section 114 and Its Implications. Academy of Managed Care Pharmacy Fall Nexus Meeting, October 4, 2016.

The role of health technology assessment in a dynamic healthcare environment. Health Technology Assessment: Current Issues in Research and Policy Making. Taipei Medical University, Taipei, Taiwan, August 17, 2016.

What to do in the absence of direct evidence – implications for comparative effectiveness research. Health Technology Assessment: Current Issues in Research and Policy Making. Taipei Medical University, Taipei, Taiwan, August 17, 2016.

Use of Real-World Evidence in Payer Decision Making: Fact or Fiction? International Society for Pharmacoeconomics and Outcomes Research Annual Meeting. Washington DC, May 23, 2016.

Perspectives in assessing the value of emerging therapies. Academy of Managed Care Annual Meeting, San Francisco, CA, April 19, 2016.

Separating Fact From Fiction – Drug-Drug Interactions and Clinical Decision Support. 11th Annual Louise C. Littlefield Celebrating Pharmacy Research Excellence Day, The University of Texas, Austin, Texas, April 23, 2015.

Drug-Drug Interaction Clinical Decision Support Conference Series: A multi-stakeholder approach to improving clinical decision support for drug-drug interactions. 2014 International Symposium on Human Factors and Ergonomics in Health Care: Leading the Way. Chicago, IL, March 17, 2014.

Defining clinically relevant drug interactions. American Society of Health-Systems Pharmacy Midyear Clinical Meeting. Anaheim, CA, December 9, 2014

Recommendations to Combat Drug Interaction Alert Fatigue. American Society of Health-Systems Pharmacy Midyear Clinical Meeting. Anaheim, CA, December 8, 2014

Drug-Drug Interaction Clinical Decision Support Conference Series, Pre-Meeting Symposia, American Medical Informatics Association Annual Meeting, Washington DC, November 14, 2014.

Computer Alert Fatigue – Don't Ignore These Important Drug-Drug Interactions, Arkansas Pharmacists Association Annual Meeting, Fort Smith, Arkansas, June 10, 2014.

Interpreting the clinical literature: statistical sink holes and evolving techniques, 14th Annual Physician and Pharmacy Continuing Education, Sterling, AK September 14, 2014

Jumping the crevasse between assertions of drug interactions and clinical relevant. International Biomedical Conference on Ontology, Houston, TX, October 6, 2014

Proving the Value for Oncology Therapy Using Comparative Effectiveness Research, ABBV, Los Angeles, CA April

Drug-Drug Interactions Every Pharmacist Should Know. University of Colorado Health Science Center Campus, Aurora, CO February 22, 2014

Overview of Statistical Approaches Used in CER. American College of Clinical Pharmacology, National Webinar, August 31, 2014.

Crying Wolf? Clinical Decision Support and Drug Interactions. University of Texas College of Pharmacy, April 24, 2014.

Computer-aided Medication Surveillance: Focus on Drug-Drug Interactions. International Pharmaceutical Federation (FIP) Centennial Congress, Amsterdam, The Netherlands, October 5, 2012

Comparative Effectiveness Research and Medication Formulary Decision Making in American Natives. 24th Annual Native Health Research Conference, Seattle, WA, July 18, 2012

Introduction to Comparative Effectiveness Research. CER Training Program, University of Arizona College of Pharmacy, March 12-14," 2012

Overview of statistical terms used in CER. CER Training Program, University of Arizona College of Pharmacy, March 12-14," 2012

Heterogeneity: understanding important differences relevant to CER. CER Training Program, University of Arizona College of Pharmacy, March 12-14," 2012

Fundamentals of meta-analysis – combining studies and synthesizing evidence. CER Training Program, University of Arizona College of Pharmacy, March 12-14, 2012

Mixed treatment comparisons: approaches for indirect evidence assessment. CER Training Program, University of Arizona College of Pharmacy, March 12-14," 2012

Drug-Drug Interactions Happen: A focus on the important few. 11th Annual Interdisciplinary Conference for Physicians and Pharmacists, September 9th, 2012

The clinical consequences of exposure to clinically important drug-drug interactions. Skaggs Research Symposium, University of Colorado at Denver Health Sciences, September 28, 2012

Markov modeling. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 25, 2012

Managed care workshop. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 27, 2012

Comparative Effectiveness Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 27, 2012

What is a "Clinically Important" Drug-Drug Interaction – and how can we prevent them from occurring? University Illinois at Chicago, February 10, 2012

Decision analysis and Markov modeling. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 9-11, 2012

Probabilistic models. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 9-11, 2012

Creating cost-effectiveness graphs. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 9-11, 2012

Mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 9-11, 2012

Bayesian approaches to mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 9-11, 2012

Nuts and Bolts of Comparative Effectiveness Research, University of Arizona College of Nursing, December 13, 2011

Economic Issues in the Off-Label Prescription Drug Use. University of Florida, Gainsville, Florida, March 5, 2011

Comparative Effectiveness Research and the Role of Bayesian Models to Improve Decision Making. University of Washington Western Pharmacoeconomics Conference, March 27, 2011

Comparative Effectiveness Research: The Role of Prevention of Cancer in Underserved Populations. Cancer Prevention and Control Seminar Series, University of Arizona, February 23, 2011

Evaluating Study Quality. Putting Comparative Effectiveness Research into Practice: What you Need to Know. Program delivered: April 13th, AMCP Annual Meeting, June 12, ASHP Annual meeting, July 12, Indian Health Service National P&T meeting, October 19, AMCP Educational Meeting, December 4, ASHP Mid-year Clinical Meeting, 2011.

Workshop in CER using the Effective Health Care program materials. Putting Comparative Effectiveness Research into Practice: What you Need to Know. Program delivered: April 13th, AMCP Annual Meeting, June 12, ASHP Annual meeting, July 12, Indian Health Service National P&T meeting, October 19, AMCP Educational Meeting, December 4, ASHP Mid-year Clinical Meeting, 2011.

Decision analysis and Markov modeling. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Probabilistic models. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Creating and interpreting cost-effectiveness graphs. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Bayesian approaches to mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Expected value of perfect information. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 5-7, 2011

Interpreting cost-effectiveness results. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 27, 2011

Markov Models. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 27, 2011

Case studies in pharmacoeconomic evaluations: improving the value to decision makers. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 28, 2011

Managed care workshop. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 28, 2011

Comparative effectiveness research. 10th Annual Interprofessional Conference for Physicians and Pharmacists, Sterling, AK, September 13 and 20, 2010

Interpreting cost-effectiveness results. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 22, 2010

Budget impact models: an overview of principles and practices. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 22, 2010

Case studies in pharmacoeconomic evaluations: improving the value to decision makers. Training Program in Health Outcomes and Pharmacoeconomic Research. Center for Health Outcomes and Pharmacoeconomic Research, University of Arizona. Marriott University Park, Tucson, Arizona. September 24, 2010

Decision analysis and Markov modeling. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Probabilistic models. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Creating and interpreting cost-effectiveness graphs. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Bayesian approaches to mixed treatment comparisons. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Expected value of perfect information. Advanced Course in Pharmacoeconomic Modeling. University of Arizona Center for Health Outcomes and Pharmacoeconmics, Jan 6-8, 2010

Applied Pharmacoeconomics and Healthcare Decision Making: Strategies and Case Studies to Demonstrate the Value of Pharmaceuticals. Takeda Pharmaceuticals Scientific Seminar Series, Chicago, IL, August 18, 2010

The DDI Quiz Show: Knowledge Test and A Quick Look Behind the Curtin on the Evidence for Drug

Interactions. New Mexico State Society of Health-Systems Pharmacists, Albuquerque, NM, Oct 4, 2010

Case studies involving pharmacoeconomics: improving the value to decision makers. Training Program in Health Outcomes and Pharmacoeconomic Research, Tucson, AZ September 30, 2010

Creating and interpreting cost-effectiveness results. Training Program in Health Outcomes and Pharmacoeconomic Research, Tucson, AZ December 1, 2010

Budget impact models: an overview of principles and practices. Training Program in Health Outcomes and Pharmacoeconomic Research, Tucson, AZ December 1, 2010

The DDI Quiz Show: Pharmacodynamic, Enzyme Induction, and CYP3A4 Inhibition Inhibitors. American Society of Health-Systems Pharmacists Midyear Clinical Meeting, Las Vegas, NV, December 7, 2009

National Drug Codes: Issues in Product Identification. CERT Centers for Medicare and Medicaid Special Interest Group, Webinar, November 11, 2009

Challenges in accepting real-world data evidence vs. clinical trials. International Society for Pharmacoeconomics and Outcomes Research European Meeting, Paris, France, October 24, 2009

The Arizona CERT: A Health-Systems Approach to Drug-Drug Interactions. United States Pharmacopeial Convention, Rockville, MD, Oct 15, 2009

Decision Models. Johnson and Johnson, Horsham, PA, September 29, 2009

Perceptions of Risk - Irrelevance of p-values. 8th Annual Interprofessional Conference for Physicians and Pharmacists, Sterling, AK, September 13 and 20, 2009

Fundementals and clinical applications of decision analysis: a different form of meta-synthesis. . 8th Annual Interprofessional Conference for Physicians and Pharmacists, Sterling, AK, September 13 and 20, 2009

The Arizona CERT: A Health-Systems Approach to Drug-Drug Interactions. Washington State University, Spokane, WA, August 14, 2009

Preventing Serious Drug-Drug Interactions. Phi Delta Chi Grand Council, Phoenix AZ, August 6, 2009

Decision Models, Bayer A.G., Singapore, June 20, 2009

Probabilistic Modeling in Pharmacoeconomics, Bayer, A.G., Singapore, June 20, 2009

Presenting and Interpreting Cost-Effectiveness Studies, Bayer, A.G., Singapore, June 20, 2009

Pharmacoeconomics: Incorporating Cost into Medical Decision Making. May 20, 2009, Ft. Lauderdale, FL, and March 26, 2009, Seattle, WA

Comparative Effectiveness Evidence Synthesis. University of Southern California School of Pharmacy, Los Angeles, CA, March 6, 2009

Advancing the Use of Real World Data in Formulary and Reimbursement Decision Making. Academy of Managed Care Pharmacy Fall Educational Conference. Kansas City, MO, Oct 16, 2008

Advanced Course in Pharmacoeconomic Modeling. University of Arizona, Tucson AZ, August 11-13, 2008, August 3-5, 2009, and January 6-8, 2010

Pfizer Pharmacoeconomic Training Program – Minneapolis Convention Center, Minneapolis, MN, August 4-5, 2008

Pharmacoeconomic research: who cares and why. Urology/Dermatology Scientific Liaison Training for Astellas Pharma, Inc. Kansas City, KS, August 20, 2007

Pharmacoeconomic research: who cares and why. Infectious Disease/Immunology Scientific Liaison Training for Astellas Pharma, Inc. Chicago, IL, August 22, 2007

Pharmacoeconomic methodology. Urology/Dermatology Scientific Liaison Training for Astellas Pharma, Inc. Kansas City, KS, August 20, 2007

Pharmacoeconomic methodology. Infectious Disease/Immunology Scientific Liaison Training for Astellas Pharma, Inc. Chicago, IL, August 22, 2007

Evaluating pharmacoeconomic literature: PE model for treatment for overactive bladder disease. Urology/Dermatology Scientific Liaison Training for Astellas Pharma, Inc. Kansas City, KS, August 21, 2007

Evaluating pharmacoeconomic literature: Empirical Anti-Candida Therapy Among Select Patients in the ICU: A Cost-Effectiveness Analysis Infectious Disease/Immunology Scientific Liaison Training for Astellas Pharma, Inc. Chicago, IL, August 22, 2007

Expected value of perfect information: determining if additional research is needed. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Meta-analysis and Bayesian approaches to mixed treatment comparisons. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Mixed treatment comparisons. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Creating and interpreting cost-effectiveness graphs. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Probabilistic models: addressing uncertainty, heterogeneity, and incorporating distributions into models. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Markov Modeling. University of Arizona Advanced Course in Pharmacoeconomic Modeling. College of Pharmacy, Tucson, AZ, August 6, 2007

Identifying and managing clinically important drug-drug interactions. Southwestern Clinical Pharmacy Seminar, March 2, 2007. Tucson, AZ

Excel-based probabilistic cost-effectiveness analysis. University of Utah, Salt Lake City, UT, February 9, 2007

Mix treatment comparisons. University of Utah, Salt Lake City, UT, February 9, 2007

Introduction to Bayesian statistics. University of Utah, Salt Lake City, UT, February 9, 2007

Probabilistic modeling in pharmacoeconomics. University of Utah, Salt Lake City, UT, February 9, 2007

Identifying and preventing drug-drug interactions: the role of health care technology systems. National Taiwan University, Taipei, Taiwan, December 19, 2006

Making better decisions under uncertainty: the role of pharmacoeconomics. National Defense Medical Center. Taipei, Taiwan, December 18, 2006

Markov models: a subset of decision analysis. Centocor, Harrisburg, PA, December 10, 2006

The AMCP dossier process. University of Arizona Certificate Program in Pharmacoeconomics. September 28, 2006

Markov decision analysis. University of Arizona Certificate Program in Pharmacoeconomics. September 27, 2006

Case studies involving pharmacoeconomics: improving the value to decision makers. University of Arizona Certificate Program in Pharmacoeconomics. September 27, 2006

Examining the top side in cost-effectiveness: pharmaceutical pricing in the US and evidence (or not) of competition in the pharmaceutical industry. Centre for Health Economics, University of York, Heslington, England. July 13, 2006

Medicare Part D. 4th Hurdle. London, England, June 26, 2006

Developing a formulary plan for a new medication. TAP Pharmaceuticals. Chicago, IL. March 8, 2006

Strategic Planning for Health Economics and Health Outcomes Research. TAP Pharmaceuticals. Chicago, IL. March 8, 2006

Potential Value of Quality of Life Research. TAP Pharmaceuticals. Chicago, IL. March 8, 2006

Metabolic syndrome – defining a growing problem. University of Arizona January Conference, January 25, 2006

Markov Decision Analysis. Kaiser Permanente of Colorado, Aurora, CO, January 19, 2006

Metabolic syndrome – defining a growing problem. University of Wyoming, Laramie, WY, January 13, 2006

Symposia

Informatics and Interoperability. International Society for Pharmacoeconomics Annual Meeting, Washington DC 2017.

Informatics and Interoperability. International Society for Pharmacoeconomics Annual Meeting, Philadelphia PA, 2016.

Recommendations to Combat Drug Interaction Alert Fatigue. American Society of Health-Systems Pharmacists, Anaheim, CA. December 8, 2014,

Drug-Drug Interaction Clinical Decision Support Conference Series, American Medical Informatics Annual Meeting, Washington DC, November 14, 2014.

Drug-Drug Interaction Clinical Decision Support Conference Series, A Multi-Stakeholder Approach to Improving Clinical Decision Support for Drug-Drug Interactions. Human Factors Engineering Society, Chicago, IL, March 18, 2014.

Overview of Heterogeneity and Using Statistical Information to Identify Heterogeneity. National Managed Care Round Table, Dallas, TX. October 19, 2012

Heterogeneity: Understanding Important Differences Related to CER. Academy of Managed Care Pharmacy Educational Meeting, Cincinnati, OH, October 3, 2012

Comparative Effectiveness Research and Medication Formulary Decision Making in American Natives. 24th Annual Native Health Research Conference, Seattle, WA, July 18, 2012

Comparative Effectiveness Research: From Conception to Practical Application, AMCP Fall Educational Meeting, October 20, 2011

Making Decisions in Health Care Delivery: The Role of Pharmacoeconomic Evaluations. California Society of Rheumatology, Los Angeles, California, May 21, 2011

The Carrot and the Stick: Is Meaningful Use Criteria for Electronic Records Becoming Meaningless Criteria? Sterling, Alaska, September 12 and 19, 2011

Walking the tightrope: balancing formulary management while decreasing rates of non-adherence and non-compliance for better quality care. Academy of Managed Care Pharmacy Annual Meeting April 17, 2008. Session Chair.

Patient perspectives on the managed care benefit. Presentation provided during symposia titled "Walking the tightrope: balancing formulary management while decreasing rates of non-adherence and non-compliance for better quality care." Academy of Managed Care Pharmacy Annual Meeting April 17, 2008.

Controlling the Monster? A report card on pharmaceconomic evaluations. Presentation provided during symposia titled "*Re*-defining the role of pharmacoeconomic analyses in a new age of specialty and biologic products." Academy of Managed Care Pharmacy Annual Meeting April 16, 2008.

Lessons learned from drug-drug interactions: implications for risk management. Implementation of Risk Minimization Action Plans (RiskMAPs) to Support Quality Use of Pharmaceuticals: Opportunities and Challenges. Joint Food and Drug Administration and Agency for Healthcare Research and Quality Workshop on Risk Minimization Action Plans. Rockville, MD, June 26, 2007.

Identification of clinically significant drug-drug interactions and management strategies. ASHP Midyear Clinical Meeting. December 6, 2006

Making better decisions under uncertainty: the role of pharmacoeconomics. Academy of Managed Care Pharmacy Fall Educational Meeting, Chicago, IL, October 6, 2006

AWARDS and HONORS

2017	International Society for PharmacoEconomics and Outcomes Research Distinguished Service Award
2015	University of Texas Clifford Littlefield Distinguished Seminar in Pharmaceutical Research
2013	Fellow- Academy of Managed Care Pharmacy

2010	Food and Drug Administration – Levering Collaboration Award, Safety of Science
2010	International Society for PharmacoEconomics and Outcomes Research Distinguished Service Award
2005 – 2006	Pharmaceutical Research and Manufacturers Association Foundation Sabbatical in Health Outcomes Award
1993 - 1994	AHCPR Post-doctoral Fellowship in Health Services Research
1992 - 1996	AFPE "Academia-Oriented Springboard to Teaching" Fellow in Pharmacy Administration
1989	NABP Foundation Scholarship Award
1987	Excellence in Pharmacy Award, University of Colorado
1986	Professional Achievement Award, School of Pharmacy University of Colorado
1985	Professional Achievement Award, School of Pharmacy University of Colorado

ASSOCIATION MEMBERSHIPS

American Association of Colleges of Pharmacy
American Pharmacists Association
American Society of Health-Systems Pharmacists
Academy of Managed Care Pharmacy
International Society of Pharmaceutical Outcomes Researchers
Rho Chi Pharmacy Honor Society

REVIEWER

American Journal of General Practice
American Journal of Health-Systems Pharmacy
American Journal of Managed Care
Annals of Internal Medicine
Archives of Internal Medicine
BMJ Open
British Journal of Pharmacology
British Journal of Clinical Pharmacy
Clinical Therapeutics
Clinical Pharmacology and Therapeutics
Critical Care Medicine
Current Medical Opinion and Research
Current Therapeutic Research
Drug Safety
Drugs and the Elderly
Drug and Aging
Formulary
Health Services Research
JAMA
Journal of the American Geriatrics Association
Journal of the American Medical Informatics Association
Journal of Clinical Epidemiology
Journal of Clinical Oncology
Journal of General Internal Medicine

Journal of Managed Care Pharmacy
Journal of the American Pharmaceutical Association
Journal of Psychiatry
Journal of Rheumatology
Medical Care
Pharmacoepidemiology and Drug Safety
Pharmacotherapy
Pharmacy Practice
PharmacoEconomics
Research in Social and Administrative Pharmacy
Respiratory Medicine
Stem Cells
Stroke
Value in Health

PHARMACIST LICENSURE

1987 - 2013	State of Colorado, #12379
1988 - Present	State of Texas, #30390

PHARMACY PRACTICE EXPERIENCE

1990 - 1993	Nau's Pharmacy, 2401 San Gabriel, Austin, Texas
1989 - 1993	Johns Community Hospital, Taylor, Texas
1989 - 1990	38th Street Pharmacy, Austin, Texas
1988 - 1989	Walgreens, Austin Region, Texas
1987 - 1988	St. Mary-Corwin Hospital, Pueblo, Colorado